



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/731,697

12/09/2003

Rolf Freimann

91153

3267

24628

7590

01/05/2006

WELSH & KATZ, LTD
120 S RIVERSIDE PLAZA
22ND FLOOR
CHICAGO, IL 60606

EXAMINER

DETSCHER, MARISSA

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 01/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/731,697

Applicant(s)

FREIMANN, ROLF

Examiner

Marissa J. Detschel

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35

U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. DE 102 58 248.3, filed on December 13, 2002.

Specification

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
- (f) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

- (I) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

The disclosure is objected to because of the following informalities: The statement "The optical axis 3 of the imaginary parent 1 and the optical axis of the interferometer 3, which is not illustrated, thus do not coincide" on page 6, lines 9-12 of the Applicant's disclosure should read "The optical axis A of the imaginary parents 1 and the optical axis of the interferometer 3, which is not illustrated, thus do not coincide."

Appropriate correction is required.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the axis of rotation of the basic body and the optical axis of the interferometer must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claim 25 is objected to because of the following informalities:

Claim 25 is dependent from claim 23, and claim 25 contains limitations that claim 23 already contains from claim 19. Examiner suggests making claim 25 dependent on claim 24, because claim 24 does not contain these limitations. The claims were examined as such.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 14, 18, and 24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in

the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In said claims, Applicant discloses a system for interferometric fit testing of a specimen having an aspherical surface in reflection, the specimen being a segment of a rotationally symmetric basic body comprising an interferometer and a diffractive optical element. The arrangement of the interferometer and the diffractive optical element is not claimed, and the Examiner was only able to determine this arrangement based on the figures provided.

Furthermore, Applicant claims a specific angular relationship between the optical axis of the interferometer and an axis of rotation of the basic body. Neither of these axes are illustrated in the figures or explained thoroughly in the Applicant's disclosure. Examiner took the optical axis of the interferometer as being the direction of the beam paths emanating from the interferometer as illustrated in the figures, and took the axis of rotation of the basic body as being virtually any axis along the body, since the body is stated as being rotationally symmetrical.

Claims 2-13, 15-17, 19-23, and 25, which are dependent from claims 1, 14, 18, and 24, inherit the problems of these claims, and are therefore also rejected under 35 U.S.C. 112, first paragraph.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 2877

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-5, 8-10, 13, 14, 16-18, 20, and 21 are rejected under 35

U.S.C. 102(b) as being anticipated by Burge, et al. (USPN 5,737,079), as is understood by the examiner.

Regarding claim 1, Burge discloses an interferometric system for testing a specimen (6, 14, 25) having an aspherical surface in reflection (7, 15, 26), the specimen being a segment of a rotationally symmetrical basic body, comprising

an interferometer (1,2,8,9,10) and a diffractive optical element (5,13, 24,and 29),

wherein an optical axis of the interferometer in the beam direction behind the diffractive optical element (13) and an axis of rotation of the basic body (6) form an angle that differs from zero,

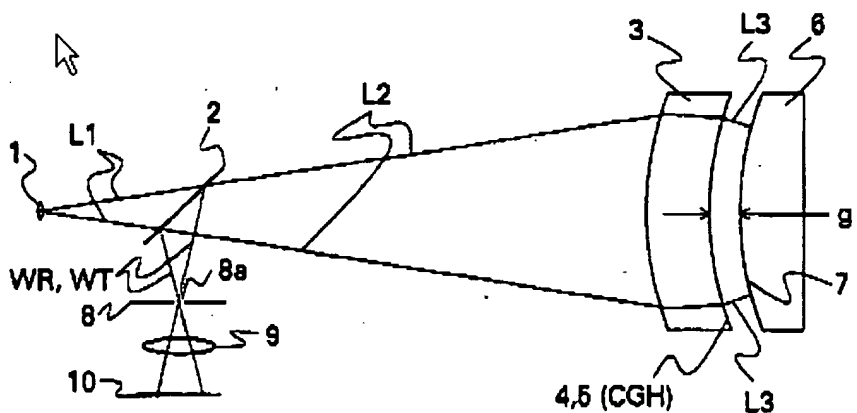


Fig. 4

As is show in the figure above, and is understood by the examiner, the optical axis of the interferometer is the axis of the direction of the beam paths (L2) being sent to

the basic body (6). The axis of rotation of the basic body can be taken to be any axis along the body, since the body is rotationally symmetrical.

and the diffractive optical element being designed in such a way that the rays produced by the interferometer and falling into the diffractive optical element strike the specimen perpendicularly and from there run back in themselves (Figure 3 below).

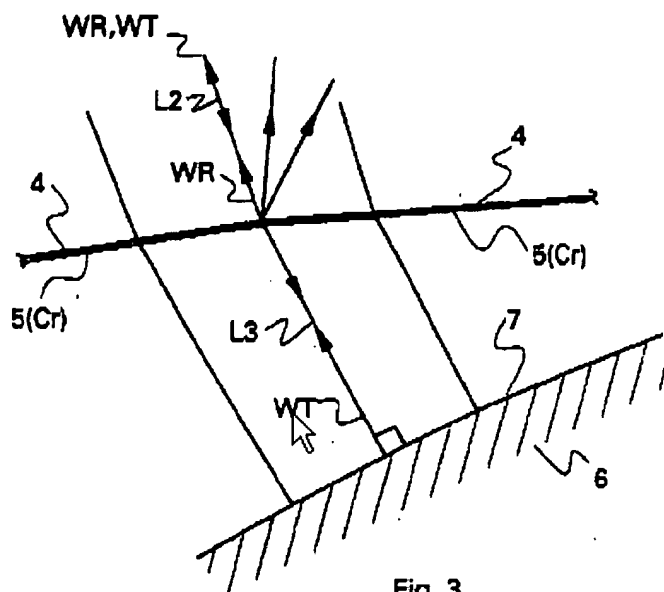


Fig. 3

As shown in this figure, 4 represents the reference surface with the diffractive optical element and 6 represents the apheric test plate. The test wavefront (L3) that is sent from the interferometer and into 4, reflects off 6 perpendicularly and runs back in themselves, as indicated by the double arrows.

Furthermore, although Burge does not specifically state that the basic body is rotationally symmetric, Burge does disclose that there is a rotational symmetry involved with most apheric optics. The basic body (i.e. test surface (6,14, 25)) with the aspheric

Art Unit: 2877

surface (7, 15, 26) being tested using Burge's interferometric system represents an aspheric optic, and therefore, there is a rotational symmetry involved with it, and the basic body is rotationally symmetric.

In regards to claim 14, Burge discloses using a planar plate (Schmidt plate) as the specimen (column 7, lines 27-43 and figures 8 and 9).

In regards to claim 18, Burge discloses the use of a spherical mirror as the specimen (Figure 6).

Regarding claims 3 and 16, Burge discloses the use of a planar wave (aspheric wavefront) (column 2, lines 1-3).

In regards to claims 4, 17, and 21 the test wave (L2) strikes the diffractive optical element (4) at an angle, as shown in Figure 3 provided above.

Regarding claims 5 and 20, Burge discloses the use of a spherical wave (column 1, lines 48-53).

In regards to claims 8 and 9, the CGH is formed as a chromium mask (column 5, lines 51-53).

Regarding claim 10, the CGH of Burge is a phase hologram (column 2, lines 40-43).

In regards to claim 12, Burge discloses a line density of the CGH being chosen such that the CGH can be written sufficiently accurately by scalar optical diffraction methods (column 2, line 66 to column 3, line 6).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 15, and 19 rejected under 35 U.S.C. 103(a) as being unpatentable over Burge et al (USPN 5,737,079) in view of Freimann et al. (Freimann, R., Dorband, B., and Holler, F. "Absolute measurement of non-comatic aspheric surface errors," *Optics Communications*, 161 (1999) 106-114), as is understood by the examiner.

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing

that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

In regards to claims 2, 15, and 19 Burge discloses the use of a reference surface (4) between the diffractive optical element (5) and the interferometer (1, 2, 8, 9, 10) that produces a reference wave (WR) required for an interferogram, as shown in figure 3 above. Burge also discloses measuring the specimen in an order of diffraction differing from zero (column 2, lines 40-43). Burge does not disclose determining non-rotationally symmetrical interferometer errors to draw conclusions about the rotationally symmetrical errors of the basic shape.

Applicant discloses using the method of Freimann, et al., to determine non-rotationally symmetrical interferometer errors with respect to the interferometer axis (page 3, lines 19-24). These errors could be used to draw conclusions about the rotationally symmetrical errors of the basic shape. Non-rotationally symmetrical interferometer errors in these systems are due to the optical elements used in the system (i.e. misalignment of the elements, defects in the elements). If non-rotationally symmetrical errors are present in the system, they will directly affect the rotationally symmetrical errors of the basic shape being tested by the system because the optical elements are being used to detect errors of the basic shape. As the light is sent through these optical elements to detect rotationally symmetrical errors of the basic shape, it takes with it the non-rotationally symmetrical errors as well, and this can create more errors in the system. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the method of Freimann to determine non-rotationally

Art Unit: 2877

symmetrical interferometer errors and to use these errors to draw conclusions about the rotationally symmetrical errors of a basic shape being tested in order to determine all possible sources of error in the measurement, resulting in a more accurate result.

Regarding claims 24 and 25, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987). The claimed system for interferometric fit testing can be used to test the fit of a mirror optical system in EUV-lithography.

Conclusion

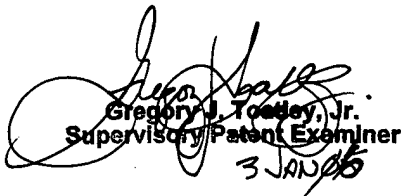
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marissa J. Detschel whose telephone number is 571-272-2716. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on 571-272-2059. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2877

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Marissa Detschel
December 28, 2005
MJD


Gregory J. Tooley, Jr.
Supervisory Patent Examiner
3 JAN 2006